

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

Argued March 24, 2000 Decided June 30, 2000

No. 98-1214

Alabama Power Company, et al.,  
Petitioners

v.

Federal Energy Regulatory Commission,  
Respondent

Florida Power & Light Company and  
The City of Tallahassee, Florida,  
Intervenors

On Petition for Review of Orders of the  
Federal Energy Regulatory Commission

Dan H. McCrary argued the cause for the petitioners.  
Andrew W. Tunnell was on brief. Rodney O. Mundy entered an appearance.

Monique Penn-Jenkins, Attorney, Federal Energy Regulatory Commission, argued the cause for the respondent. John H. Conway, Acting Solicitor, Federal Energy Regulatory Commission, and Timm L. Abendroth, Attorney, Federal Energy Regulatory Commission, were on brief.

Gary D. Bachman and Cheryl M. Feik were on brief for intervenor City of Tallahassee, Florida.

Steven Jay Ross entered an appearance for intervenor Florida Power & Light Company.

Before: Edwards, Chief Judge, Henderson, Circuit Judge and Buckley, Senior Circuit Judge.

Opinion for the court filed by Circuit Judge Henderson.

Karen LeCraft Henderson, Circuit Judge: Petitioners Alabama Power Company, Georgia Power Company, Gulf Power Company, Mississippi Power Company, Savannah Electric and Power Company and Southern Company Services, Inc. (collectively, the Southern Companies, petitioners) seek review of two orders of the Federal Energy Regulatory Commission (FERC, Commission) rejecting two components of the rates they had proposed for supplying electric power to the City of Tallahassee, Florida (City).<sup>1</sup> The first component is "turbine assembly costs" and the second is "heating loss costs." With regard to the former, the Southern Companies argue that FERC's policy as applied here is inconsistent with a recent FERC decision allowing recovery of such costs. With regard to the Commission's denial of recovery for heating loss, the Southern Companies argue that the method they used to calculate loss, yielding results FERC deemed unreliable, is used by FERC for related purposes. They also argue that the Commission's concern over double recovery of heating loss costs is misplaced.

For the reasons set forth below, we grant the petition for review and remand to the Commission for proceedings consistent with this opinion and with its recent decision approving recovery of turbine costs to determine whether the Southern Companies justified this component of its rate.

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<sup>1</sup> The City filed an intervenor brief in support of FERC's decisions.

#### I.

In 1990 the Southern Companies filed a Unit Power Sales (UPS) Agreement between themselves and the City proposing the sale of certain electric power capacity to the City for a term of ten years. The UPS Agreement prescribed transmission charges for various support services, including a monthly reactive control charge for the costs associated with generator-supplied reactive power. The Southern Companies then faced the task of satisfying FERC that their proposed reactive power charge was just and reasonable. Hearings before an administrative law judge yielded an Initial Decision largely approving the Southern Companies' proposal, concluding that "the proposed reactive power charges, with modification to certain component allocations and [the Southern Com-

panies'] reactive power credits, are just and reasonable." Southern Co. Servs., Inc., 61 FERC p 63,009 at 65,024 (1992). The Commission affirmed in part and reversed in part, taking issue with certain aspects of the Southern Companies' methodology. See Southern Co. Servs., Inc., 80 FERC p 61,318 (1997). The Commission's two modifications at issue here, on which the Commission stood firm in denying rehearing, see 82 FERC p 61,168 (1998), are the exclusion of turbine assembly costs and the exclusion of heating loss costs.

The Commission described reactive power and its role in the provision of electric power as follows:

Electric power consists of two components. The first component, "real" power (expressed in terms of watts), is the active force that causes electrical equipment to perform work. The second component, "reactive" power, (expressed in terms of volt-amperes reactive (VARs)) is necessary to maintain adequate voltages so that "real" power can be transmitted.

Failure to provide the correct amount of reactive power at various points on the transmission system can cause deviations from desired voltage levels and disruption in the flow of power on the system. In order to maintain desired voltage levels, reactive power must be supplied

or absorbed by generators (or transmission equipment)  
at various points on the transmission system.

Southern Co. Servs., Inc., 80 FERC at 62,080 (footnotes omitted).

The Southern Companies utilize generators to produce reactive power and the production of reactive power causes heating loss that increases fuel consumption and demand on the generators. See Brief of Commission at 36.2 The Southern Companies factored the heating loss into its costs equation, seeking to recoup for the required use of additional fuel and for a portion of the generators' real power capacity. To calculate costs, the Southern Companies combined the cost of reactive power "impacts" on their energy system with the heating loss cost to arrive at a control charge. Brief of Petitioners at 12. They determined the cost of the reactive power impacts through use of two load flow studies. One study measured the "base-case" load flow conditions and quantified the reactive power requirement of all generators in the transmission system. The other, a "transaction-case" load flow study, measured the effect on the system of an energy transaction similar to those proposed in the UPS Agreement with the City. A comparison of the studies demonstrated the impact (measured in megavolt ampere reactives (MVARs)) of individual transactions under the UPS Agreement, allowing the petitioners to determine the amount of generating capacity lost in each transaction and then to multiply that figure by an average energy rate and thus quantify the heating loss resulting from production of reactive power necessary to supply the City.

The petitioners also sought to recoup, through the proposed reactive power charge at issue, costs incurred from use of their generators to supply or absorb reactive power. Hav-

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<sup>2</sup> See also Joint Appendix (JA) 180 (testimony of FERC staff member) ("Producing or absorbing reactive power at a generator results in real power heating losses in the generator and [this] heating loss requires that fuel be burned [and] causes a portion of the real capacity of [sic] generator to be consumed producing the heating loss.").

ing determined the amount of MVARs the transactions under the UPS Agreement demanded, their next step in calculating the charge was to identify the six major generator components associated with reactive power production.<sup>3</sup> Relying on the connection between the turbines and the production of reactive power,<sup>4</sup> the Southern Companies included the "turbine assembly"<sup>5</sup> as one of the six major components in its costs calculation. Using these components, they estimated the plant investment associated with production of reactive power. Because the turbine assembly is involved with the production of both real power and reactive power, the Southern Companies included in their estimate, and thus in the reactive power charge, only that portion of the turbine assembly cost allocated to reactive power based on the ratio of total power to reactive power. See 80 FERC at 62,083.

The Commission concluded the Southern Companies' calculations suffered from "erroneous modeling assumptions and

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<sup>3</sup> They identified the (1) exciter, (2) exciter cooling system, (3) generator stator, (4) rotor, (5) turbine assembly and (6) step-up transformers. See 80 FERC at 62,083.

<sup>4</sup> Turbines are mechanical devices with fan-like blades that rotate when steam, for example, is forced through them. The resulting mechanical energy powers a connected instrument like a generator (or, more specifically, a generator's exciter): "The turbine produces the mechanical [or real] power to turn the generator, which, in turn, produces both real and reactive power." 80 FERC at 62,090 n.65; see 82 FERC at 61,611. A turbine is essential to the production of reactive power. See JA 212-13 (testimony of petitioners' witness) ("Without the turbine, there would be no production of real or reactive power[;] the exciter is driven by the rotor and turbine assembly, and thus that equipment is directly involved in the production of reactive power.").

<sup>5</sup> The turbine assembly is "the device [or motor] that turns the exciter within the magnetic field" and includes "all of the equipment that is on the same shaft," described as "a lot of equipment." See JA 248-49 (testimony of petitioners' witness). "Turbine assembly" is used interchangeably with "turbine(s)," see, e.g., 80 FERC at 62,091; Brief of Commission at 17-18, and there is "not generally" a difference between the two terms. JA 248.

flawed rate design." Id. at 62,084. The load flow studies used to calculate heating loss costs came under attack first. The base-case load flow study reflected a hypothetical operating condition that, as the Southern Companies' expert conceded, is not typical or desirable. See id. at 62,084-85. The Commission disapproved the transaction cases as well because the Southern Companies' calculations did not account for possible generator responses that benefit the system by either absorbing or producing fewer MVARs. For example, some transactions cause a decrease in the absorption of MVARs, a benefit to the transmission system, but the petitioners' calculations reflected this reduction of demand on the system as an increase in demand for reactive power service. As the Commission phrased its concern, "[j]ust as one would expect not to be charged more for consuming less energy, one would expect not to be charged more for reducing reactive

power support." Id. at 62,086. In addition to disapproving the petitioners' methodology, FERC concluded that they had not explained why their fuel adjustment clause, designed to enable a utility to recover from its power customers the fuel expense associated with producing power, see Brief of Commission at 39, did not already ensure recovery of these costs. The Commission concluded that, absent such a showing, the petitioners' proposed rate would result in a prohibited double recovery of costs. See 80 FERC at 62,089.

Turning to the turbine assembly costs, the Commission disallowed their inclusion in the petitioners' reactive power charge because, in its words, "turbines produce only real power." Id. at 62,091. In contrast, it noted that the generators, in addition to producing real power, produce (or absorb) reactive power. Accordingly, the Commission agreed that costs of the generator and its parts are appropriately included in the reactive power charge. The Commission also noted that reactive power can be produced by a generator disconnected from its turbine and operated as a "synchronous condenser."<sup>6</sup> In the end, the Commission determined that

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<sup>6</sup> As the Commission notes, the Southern Companies do not use these self-powered generators. See Brief of Commission at 7 n.2.

the Southern Companies failed to establish that their rates were just and reasonable.

In denying rehearing, the Commission again addressed the recovery of turbine assembly and heating loss costs. While the Southern Companies compared the costs associated with the turbine that powers a generator to the cost of electricity that powers a synchronous condenser, which the Commission agreed would be recoverable under a reactive power charge, the Commission again concluded that recovery of turbine assembly costs was not appropriate because turbines produce only real power notwithstanding their contribution to the generators' production of reactive power. See 82 FERC at 61,611. With regard to heating loss costs, FERC again rejected the load flow studies and also declined to accept the summary of actual meter readings,<sup>7</sup> which the Southern Companies submitted with their rehearing request, because the readings "represent[ ] a moving target" and use of actual data was inconsistent with FERC's approach "not to adjust estimates for actuals." *Id.* at 61,612. Finally, the Commission remained unconvinced that the petitioners' revenue crediting mechanism prevented double recovery of heating loss costs. See *id.*

## II.

We review FERC's orders under the arbitrary and capricious standard of the Administrative Procedure Act (APA). See 5 U.S.C. s 706(2)(A) (1994); *Sithe/Independence Power Partners v. FERC*, 165 F.3d 944, 948 (D.C. Cir. 1999). We explained the applicable standard of review in *Northern States Power Co. v. FERC*, 30 F.3d 177, 180 (D.C. Cir. 1994):

The Federal Power Act requires that rates for "the transmission ... of electric energy subject to the juris-

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<sup>7</sup> The Southern Companies submitted the actual meter readings showing the system's total MVAR production for 1991 and the "Reactive Power Effects on Southern Company Generators," JA 425. The total MVAR production was greater than they had estimated. See *id.* at 419-20, 423 (5897 MVARs versus 4954 MVARs).

diction of the Commission ... be just and reasonable." 16 U.S.C. s 824d(a). Because "[i]ssues of rate design are fairly technical and, insofar as they are not technical, involve policy judgments that lie at the core of the regulatory mission," our review of whether a particular rate design is "just and reasonable" is highly deferential. *Town of Norwood v. Federal Energy Regulatory Commission*, 962 F.2d 20, 22 (D.C. Cir. 1992). Our review is not, however, an empty gesture: the Commission must be able to demonstrate that it has "made a reasoned decision based upon substantial evidence in the record." *Id.*

The Southern Companies argue that the Commission's exclusion of turbine assembly costs from the reactive power charge was arbitrary and capricious because the real power created by the turbine is essential to the generator's production of reactive power. In producing reactive power, the generator derives power from the turbine, the generator's "prime mover." Brief of Commission at 7; see JA 177; 80 FERC at 62,091. Although FERC allows recovery of generator costs, it disallowed recovery of the petitioners' turbine assembly costs. In fact, FERC allows recovery of costs of electric power serving as the prime mover of a synchronous condenser generator producing reactive power, that is, a generator disconnected from the turbine assembly. See 82 FERC at 61,611 & n.6. The Southern Companies contend that the recoverability of costs for the prime mover of a generator should not depend on whether the generator's prime mover is electric power, as with a synchronous condenser, or a turbine. FERC chose to draw the costs recovery line at the generator and its integral parts rather than at its prime mover. We need not decide whether the line is reasonably so drawn, however, because FERC's treatment of the Southern Companies' turbine costs compared with its treatment of turbine costs in *American Electric Power Service Corp.*, 80 FERC p 63,006 (1997), *aff'd* in relevant part, 88 FERC p 61,141 (1999) (AEP), requires remand.

In AEP FERC allowed recovery of turbine costs as part of the investment required for the production of real power



necessary to drive the generator. In the AEP initial decision, which the Commission affirmed summarily, see 88 FERC at 61,439-40, the administrative law judge (ALJ) approved the amount of production plant investment that American Electric Power Service Corporation (AEPSC) allocated to reactive power production and sought to recover through the reactive power charge. AEPSC divided its charge into three components: "(1) the generator and its exciter, (2) accessory electric equipment that supports the operation of the generator-exciter, and (3) the remaining total production investment required to provide real power and operate the exciter." 80 FERC at 65,074. Although AEPSC omitted its investment in turbines from its generator and exciter costs, the ALJ recognized its turbine investment as a legitimate cost, see *id.* at 65,076-77, and therefore included turbine costs in the residual category of "the remaining total production investment required to provide real power and operate the exciter," *id.* at 65,074, which the ALJ labeled "Other Power Production Investment."<sup>8</sup> *Id.* at 65,079-80. FERC's allowance of recovery of turbine costs in AEP and its failure to explain its disallowance of the Southern Companies' turbine costs requires us to remand to FERC for reconsideration in light of its holding in AEP.

As the Commission points out, however, its inclusion of turbine costs in AEP does not necessarily mean it must adopt the Southern Companies' method of calculation. See Brief of Commission at 29, 35. The petitioners use "a relatively large allocation of one component (the turbine) to serve as a proxy for the amount of [the] other production plant that is attribut-

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<sup>8</sup> In brief FERC disputes that it allowed recovery of turbine costs in AEP. See Brief of Commission at 34-35. In AEP, however, FERC allowed recovery of "the remaining total production investment required to provide real power to operate the exciter." 80 FERC at 65,074. AEPSC incurred costs for investment in turbines, see *id.* at 65,077, and the turbines provide real power to operate the exciter. See *supra* notes 4 and 5. The investment in turbines was not included in the first two categories, see 80 FERC at 65,076-78, but was instead part of AEPSC's third category of recoverable costs. See *id.* at 65,079-80.

able to reactive power production" compared to the "smaller allocation of all components of the other production plant" approved in AEP. Brief of Petitioners at 31 n.18 (emphasis in original). While they insist that the end result of their methodology is "virtually identical" to that obtained with AEPSC's methodology, see id. at 33-34, we leave that determination to FERC on remand.

Although we also remand FERC's denial of heating loss recovery, the Commission's rejection of the Southern Companies' heating loss cost calculations survives our review under the APA. It disallowed recovery because the Southern Companies' calculations rested on their base-case load flow study which the Commission found flawed. The flaw, according to the Commission, resulted from the measurement of VAR output at peak operating conditions instead of normal conditions. See 80 FERC at 62,085. The Southern Companies' own witness testified that they would not operate at the level used in the calculations.<sup>9</sup> See JA 237-39, 241-42. The Commission thus determined that the petitioners' calculations did not accurately quantify their heating loss costs. See 82 FERC at 61,612; 80 FERC at 62,086. Although they seek to recast FERC's denial as based on their choice of methodology, that is, the load flow study, and not on their calculations, we conclude that the Commission rejected, correctly, their calculations associated with heating loss costs. On remand, FERC should allow the Southern Companies to recalculate the costs associated with heating loss.

The Commission further concluded that the heating loss costs should not even be reflected in the proposed rates. According to FERC, the fuel adjustment clause allows for compensation for heating loss and the Southern Companies failed to explain why the clause did not cover the heating loss

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<sup>9</sup> Before us the Commission cites only the flaw it found with the base-case study, see Brief of Commission at 36-37; in its original order, however, the Commission found the transaction-case study flawed because it did not accurately reflect "the benefits and burdens of its generators in response to the subject transactions." 80 FERC at 62,085; see p. 6 supra.

component. The Southern Companies, however, maintained that their revenue-crediting mechanism prevented double recovery and also avoided subsidy of certain customers' rates by other customers. But it was the Commission that failed to explain its rejection of the revenue-crediting mechanism. See 82 FERC at 61,612. Thus, FERC should reconsider whether all heating loss costs are recovered through the fuel adjustment clause and whether the revenue-crediting mechanism prevents double recovery of those costs that are recovered through the fuel adjustment clause. Assuming FERC's reconsideration of the petitioners' revenue-crediting mechanism discloses unrecovered<sup>10</sup> heating loss costs, FERC should allow the Southern Companies to adjust the rate accordingly so that the costs are recovered.

For the foregoing reasons, we grant the petition for review and remand to the Commission for reconsideration of the turbine assembly costs in light of its holding in *American Electric Power Service Corp.*, 80 FERC p 63,006 (1997), *aff'd* in relevant part, 88 FERC p 61,141 (1999). The Commission should also reconsider whether the Southern Companies incur unrecovered heating loss costs or heating loss costs that could be more equitably recovered.

ordered.

So

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<sup>10</sup> Even if the costs are already recovered, the Commission should consider if it is more appropriate to allow recovery through the proposed rates (with appropriate revenue-credits), that is, if the rates properly allocate costs among consumers.